Bruel & Kjaer
Precision
Instruments

B & K INSTRUMENTS, INC.

5111 WEST 164TH ST. • CLEVELAND, OHIO 44142

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INSTRUCTION MANUAL

MODEL 141B

B&K INSTRUMENTS, INC.
Bruel & Kjaer Precision Instruments
5111 WEST 164th STREET • CLEVELAND, OHIO 44142

APRIL 1972

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SECTION 1

GENERAL DESCRIPTION

1.1 Description

The B & K Model 141B Field Microphone System is a portable, battery operated, signal conditioner and line driver used for field measurements where the microphone must be located at considerable distance from the data measuring or recording terminal. All connections to the microphone amplifier and to the land lines are inside a weatherproof case which provides weather tight seals for all cables. Typical applications of the 141B would be for monitoring aircraft fly-over noise, vehicle drive-by, community noise, investigations of power line noise, acoustical radiation from power transformers and switching stations. Tailoring of the system to meet a user's particular need is provided by simply plugging in optional plug-in elements.

1.2 Specifications

Frequency Response	20 - 20,000 Hz $\pm$.5 dB (No correction filters)
Gain	0, 10, 20, 30, 40 dB
K Factor	$\pm$ 5 dB
Output Capability	Transformer, $\pm$ 20 mA Peak @ 200 Ohm
Polarizing Voltage	Basic System, 28 Volt, 200 Volt Nominal
Battery Supply	Modular, 2.2 Ampere Hours - 28 Volts Rechargeable (14 hours @ 200 mA)
System Sensitivity with 4134 Microphone & 40 dB Gain	1 Volt @ 114 dB SPL and 28 Volt Pol. E. 1 Volt @ 94 dB SPL and 200 Volt Pol. E.

SECTION II

INSTALLATION

2.1 The Model 141B is a portable instrument containing all the necessary elements for a field installation within its case. To set up the system, select a fairly level area, open case lid and remove tripod, restraining cord, 2619S Follower, extender rod, adaptor and microphone. Extend tripod legs, check for complete locking of legs and place tripod over 141B case. Place extender rod and adaptor on tripod. Remove compression fitting and split grommet from adaptor on lid. Feed follower end of cable through grommet located on lid of 141B and out through adaptor and compression fitting. Pull cable out until connector end can be inserted into its socket and locked. Secure microphone to follower and place in adaptor. Replace split grommet around cable and tighten compression fitting.

2.2 Output Cable: B & K recommendation - Belden 8724.
M-141B output transformer is frequency compensated to 20 KHz with the use of Belden 8724, from a length of zero to 4,000 ft.
Belden 8724: 4 wires, 2 shielded.

2.3 Output Connections:

Pin A:	Shielded wire, Hi Side of 200 Ohm output transformer.
Pin B:	Shield, center tap of output transformer, used for differential output.
Pin F:	Shielded wire, Lo Side of 200 Ohm output transformer.
Pin C:	Remote gain - See Figure 1.
Pin D:	Remote gain - See Figure 1.

SECTION III

CONTROL DESCRIPTION

3.1 Panel Control Buttons:

On	-	Turns power on or off.
Heater	-	Applies heater voltage to 2619 heater.
200 V	-	28 V Polarization with button up and 200 V with button down.
Battery	-	Depressing indicates battery condition.
Speaker	-	Depressing connects speaker to output line for intercom use.

3.2 Signal Conditioner M-141-1:

K Factor, screwdriver adj. $\pm$ 5 dB.
10 dB through 40 dB Pushbuttons select gain in 10 dB steps.
0 dB is obtained by having all buttons up.

3.3 Filter 141-5:

Depressing Pushbutton places Pre-emphasis Filter into the circuit.

3.4 Transformer M-141-3:

3.4.1 0 to 1500 Ft. of Cable attached to the output of 141B. Both buttons should be out.

3.4.2 1500 Ft. to 2500 Ft. of Cable, depress only 2000 Ft. button.

3.4.3 2500 to 3500 Ft. of Cable, depress only 3000 Ft. button.

3.4.4 3500 to 4000 Ft. of Cable, both buttons in.

SECTION IV

OPERATING INSTRUCTIONS

4.1 Basic 141B.

4.2 Control settings before turning on power.

"ON" - Button Up - Off Position

"Heater" - Button Up - Off Position

"200 V" - Button Up - 28 Volt Position

"Gain" - 0 dB

Filter "Out" - Button Up

Transformer Select Button for amount of Output Cable.

4.3 Turn power "On" and depress "Batt. Check" switch. If meter reading lies near red bracket indication, battery should be recharged before performing long term observations. If meter indication lies at least between the 8 & 10 dB point, there should be enough reserve battery capacity to operate unit at least 48 hours. (See Chart 1).

4.4 M-141B must have a 200 Ohm load for proper calibration (Pins A & F on output connector).

4.5 Depress 200 V. Switch.
Calibration with 4134 microphone (Use 4220 Pistonphone) -
With power on, place pistonphone over microphone and actuate. Observe monitor meter and advance gain-dB switch to successive gain settings and in combination with "K" Factor control adjust for 4 dB reading on meter scale. The unit will now be calibrated for 120 dB SPL at "0" meter reading and will yield an output voltage of 1 volt at this point. Determination of choice of gain setting will be dependent on range of SPL to be observed. At calibrated gain the range of SPL readings will be from 110 dB SPL at "40" gain setting (1 Volt out) to 160 dB SPL at "0" dB gain setting.

NOTE: See Chart II for various microphone and polarizing voltage combinations and Chart III for calibration, microphone and polarizing voltage combinations.

4.6 Select Filter - Pre-Emphasis (See Section VIII).

4.7 Intercom Use - In order to facilitate communication between field and central station, a speaker has been included in the 141B. To use, remove calibrator and speak into microphone, depress speaker button to listen and make calibration adjustments as required. The speaker has an impedance of 100 ohms and will require 50 mW of power.

4.8 After calibration has been performed, close and lock case lid and attach restraining cord to tripod and case handle and proceed with tests.

NOTE: Due to the large time constants involved, polarization should be selected with "0 dB" gain and filter "Out."

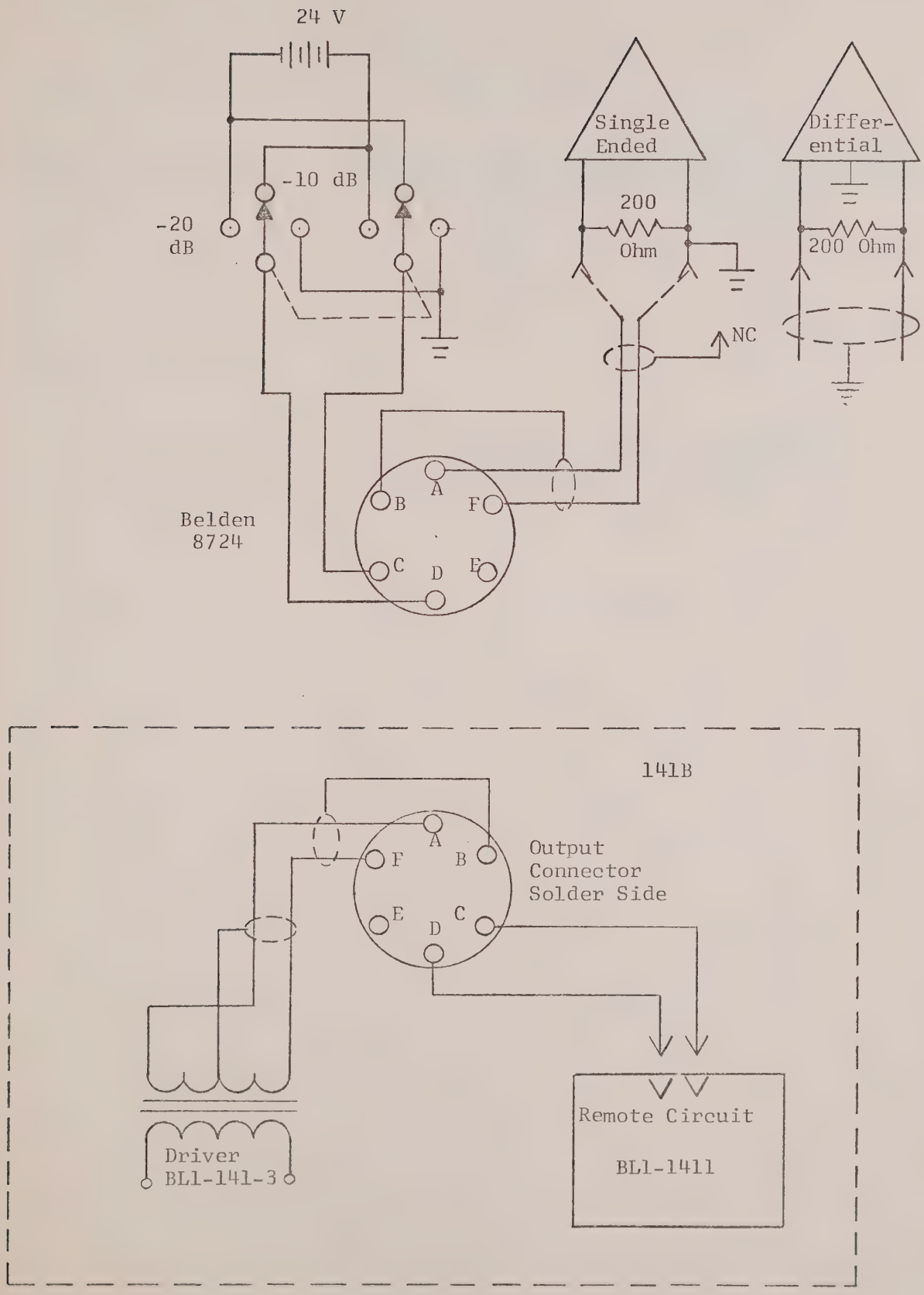


Figure 1. Remote Gain Connection

C H A R T I

Running Time for Fully Charged Battery

OPERATING CONDITION	QUIESCENT BATTERY LOAD	HOURS OF OPERATION*
Basic 141B	16 mA	40 - 120
Basic + Pre-Emphasis	25 mA	30 - 100
Basic + 2619 Heating	50 mA	25 - 40
Basic + Heating + Pre-Emphasis	65 mA	16 - 25

* Output amplifier draws 2 mA quiescent plus output signal current. First figure refers to continuous operation at high signal levels. Second figure refers to intermittent high signal levels.

C H A R T II

System Sensitivity with B & K Microphones & 200 V or 28 V Polarizing

MICROPHONE	POLARIZING	OUTPUT @40 dB	MAX.SPL @ 0 dB	BROADBAND (SPL) NOISE FLOOR
4131 4132	28 V	50 mV/microbar	146 dB	54 dB
4144 - 1" 4145 4146	200 V	0.5 V/microbar	126 dB	34 dB
4133 - 1/2"	28 V	10 mV/microbar	160 dB	68 dB
4134	200 V	0.1 V/microbar	140 dB	48 dB
4135 - 1/4"	28 V	2 mV/microbar	174 dB	82 dB
	200 V	20 mV/microbar	154 dB	62 dB
4136 - 1/4"	28 V	1 mV/microbar	180 dB	88 dB
	200 V	10 mV/microbar	160 dB	68 dB
4138 - 1/8"	28 V	.5 mV/microbar	184 dB	94 dB
	200 V	5 mV/microbar	164 dB	74 dB

C H A R T III

Output Levels of B & K Microphones & 141B Vs. Polarizing Volts using 4220 Pistonphone.

MICROPHONE	POLARIZING	GAIN - dB	OUTPUT (VOLTS)
1"	28 V	+ 20	1.5
	200 V	0	1.5
1/2"	28 V	+ 30	1
	200 V	+ 10	1
4135 - 1/4"	28 V	+ 40	1.5
	200 V	+ 20	1.5
4136 - 1/4"	28 V	+ 40	.75
	200 V	+ 20	.75
4138 - 1/4"	28 V	+ 40	.15
	200 V	+ 40	1.5

SECTION V

BATTERY CHARGING

5.1 The battery pack contained in the 141B is a nickel-cadmium type consisting of 24 cells series connected to obtain the required operating voltages. When recharging of battery is required, as indicated by battery check push-button, the following procedure is recommended.

5.2 Charging batteries with Model 141B charger:

5.2.1 Release "On" button to the "Off" position.

5.2.2 With charger plugged into its socket, connect AC cord supplied into charger socket and connect other end of cord to 115 Volt, 60 cycle power source.

5.2.3 When energized, the "Power On" light (red) will be on and if battery voltage is low, the "Charged" light (amber) will be off until full charge is attained, at which time the amber light will flicker and come on.

5.2.4 With AC applied to the charger and the amber light on, a trickle charge is placed on the battery.

5.3 The 141B can be on with the charger running but the battery will receive only a trickle charge, and the noise floor of the 141B will rise considerably.

SECTION VI

6.1 Control Board, BL1-0141, Description - Ref. Fig. 2, 3.

6.2 The control board performs four separate functions as outlined below:

6.2.1 R13, in conjunction with R12, is adjusted for a 26 Volt reading, corresponding to a 141B meter reading at the left hand edge of the red block.

6.2.2 Q1 and Q2 are arranged as a battery protection circuit which will prevent damage to the battery in the event that a heater short should develop in the follower cartridge. This protective circuit will allow the use of follower cartridges with 6 Volt heaters in emergency situations without injuring the battery. Bear in mind that battery drain under these conditions will increase to approximately 200 mA.

6.2.3 A Quasi-RMS circuit (D6, D7, C6, C7, R9, R10, C10) designed to monitor the AC output voltage of the signal conditioner. R10 is adjusted for "0" dB meter reading when 1 Volt RMS is present at amplifier output.

6.2.4 In cases where the 141B sensitivity will not yield a usable signal with 24 V polarization voltages, a 20 dB increase in overall gain can be achieved by using 200 Volt polarization. The 200 Volt circuit consists of a simple ringing oscillator with a voltage doubler and regulated by a 200 V Zener. Since the 200 Volts is Zener regulated, the actual polarization voltage is determined by the Zener tolerance which will yield a nominal 200 Volts $\pm$ 5%. This small variation is readily corrected by adjustment of the "K" Factor control when calibrating with a pistonphone.

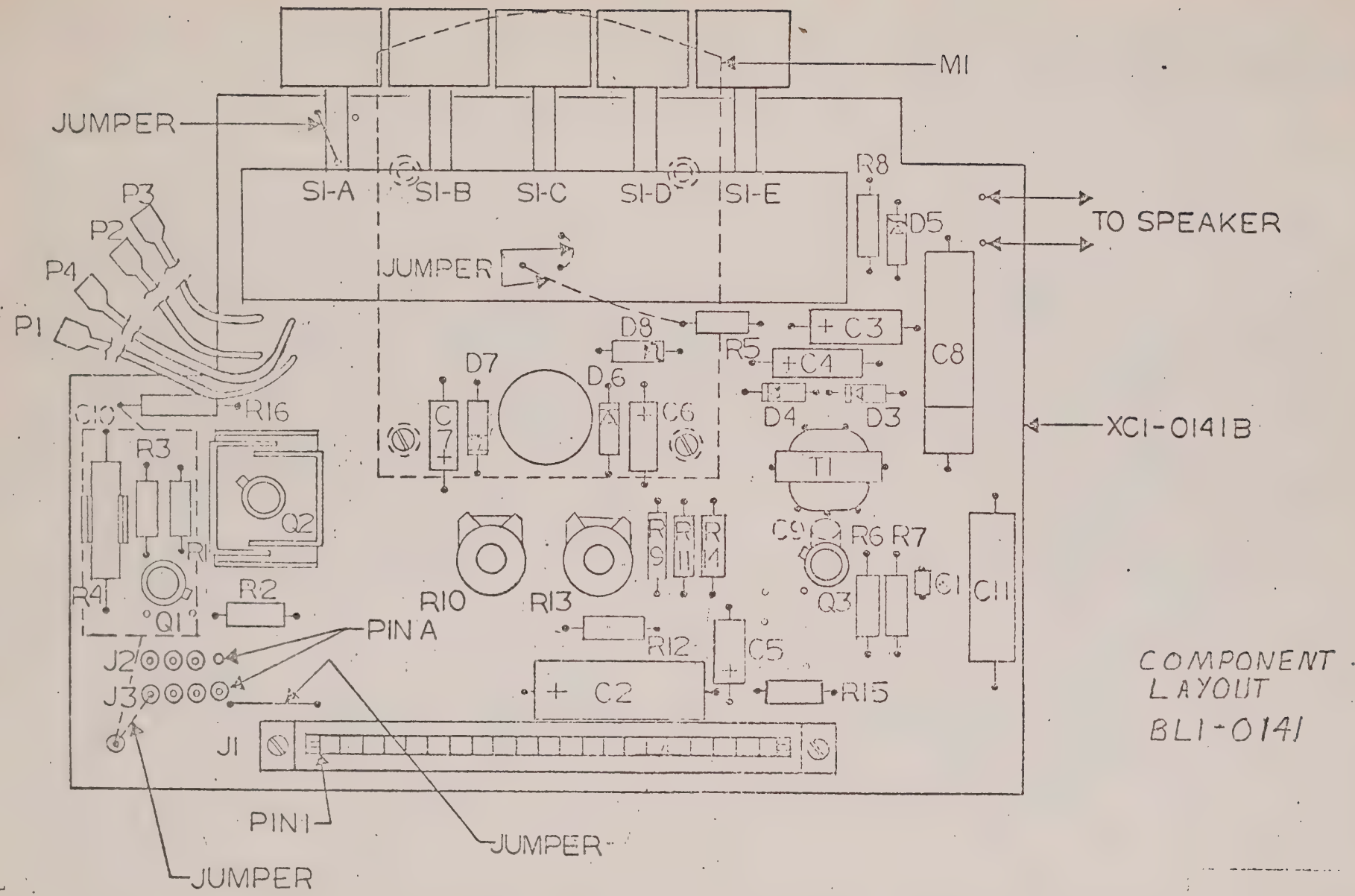
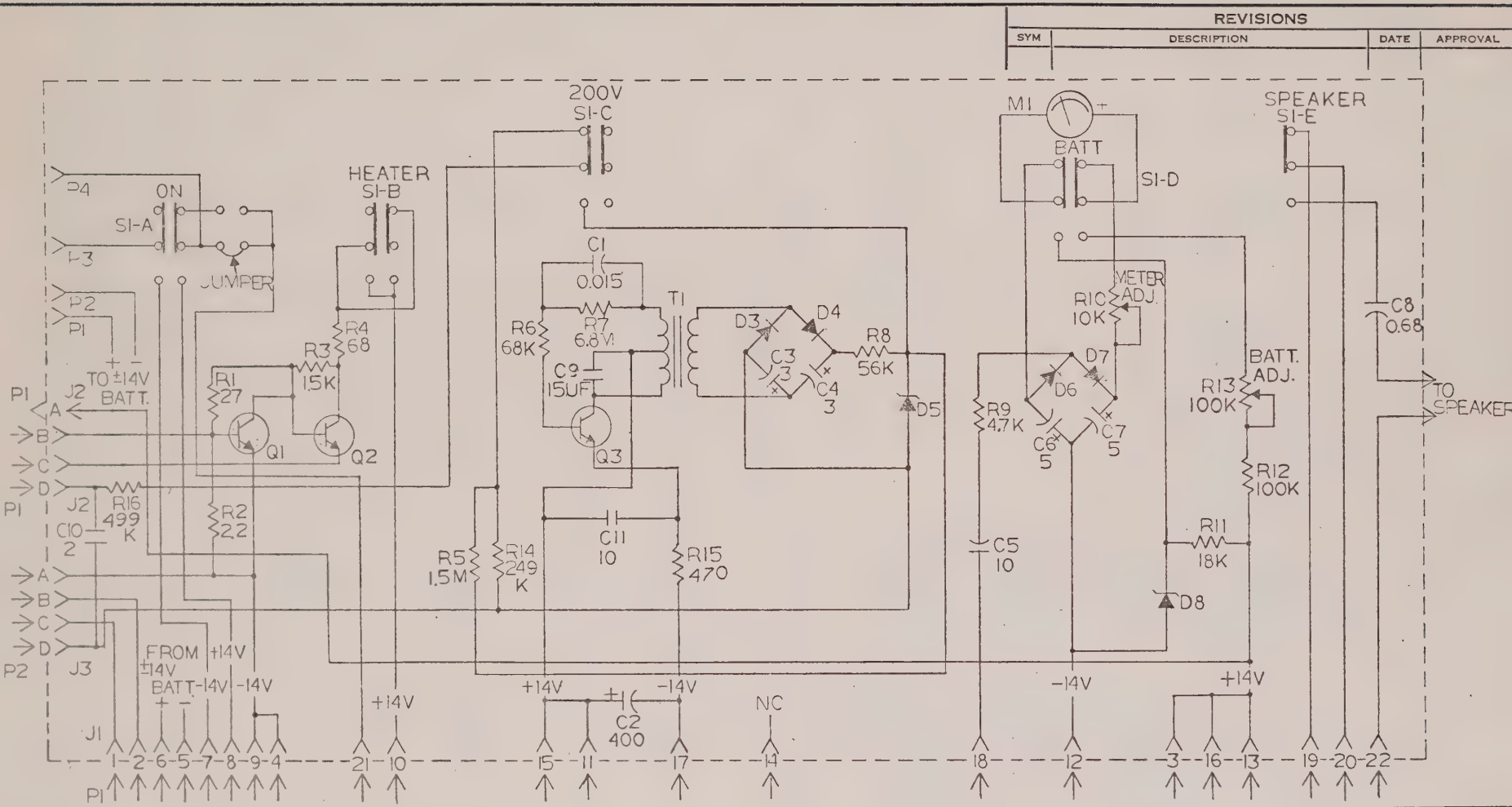

M1
JUMPER
SI-A
SI-B
SI-C
SI-D
SI-E
R8
D5
TO SPEAKER
P3
P2
P4
P1
JUMPER
D8
R5
+ C3
+C4
C8
D7
D6
C7
C6
D4
D3
XC1-0141B
C10
R16
R3
T1
Q2
C9
R6
R7
R4
R2
Q1
R10
R13
Q3
C1
C11
PIN A
R12
C5
J2
J3
+ C2
R15
J1
COMPONENT
LAYOUT
BLI-0141
PIN 1
JUMPER
JUMPER

Figure 2.



NOTES:

1. SWITCHES SHOWN IN FOLLOWING POSITION
   - SI-A POWER OFF
   - SI-B HEATER OFF
   - SI-C POL 28V
   - SI-D SIGNAL
   - SI-E SPEAKER OFF
2. ALL CAPACITOR VALUE IN MICROFARDS UNLESS SPECIFIED.
3. ALL RESISTOR VALUE IN OHMS UNLESS SPECIFIED.

SCALE	NEXT ASS'Y	S.O. 141 B
TITLE: SCHEMATIC CONTROL BOARD BLI-0141B		B & K INSTRUMENTS, INC. CLEVELAND, OHIO 44142
DRAWN B. Locker DATE 10-23-70	SIZE B	DRAWING NUMBER 1316 ISSUE 1
CHECKED J.F.M. DATE 26-Oct 70		
APPROVED W.C. DATE 10-27-70		

Ckt. Symbol	Part No.	Description	Typical Mfr.	Mfr's Part No.
C1	CK6-1533	Cap. Ceramic .015 µf @ 100 VDC	Erie	8121-100-651-153M
C2	CE4-4075	Cap. Elect. 400 µf @ 40 VDC	Bruel & Kjaer	CE-0417
C3	CE6-3055	Cap. Elect. 3 µf @ 150 VDC	Sprague	TE-1502
C4	CE6-3055	Cap. Elect. 3 µf @ 150 VDC	Sprague	TE-1502
C5	CE2-1065	Cap. Elect. 10 µf @ 12 VDC	Sprague	TE-1128
C6	CE2-5055	Cap. Elect. 5 µf @ 12 VDC	Sprague	TE-1127
C7	CE2-5055	Cap. Elect. 5 µf @ 12 VDC	Sprague	TE-1127
C8	CS5-6842	Cap. Polyester .68 µf @ 100 VDC	Eromet	HW468/0
C9	CK6-3302	Cap. Ceramic 33 PF 100 V.	Erie	8121-100-C0G0-330K
C10	CS-0028	Cap. Polyester 2 µf @ 100 VDC	B & K	CS-0028
C11	CS4-1062	Cap. Polyester 10 µf @ 63 VDC	Eromet	HW610-06
D3	QV0-0005	Diode, Silicon	Motorola	IN4003
D4	QV0-0005	Diode, Silicon	Motorola	IN4003
D5	QV2-0009	Diode, Zener 200 V	Motorola	IN5281B
D6	QV1-0001	Diode, Germanium	Sylvania	IN277
D7	QV1-0001	Diode, Germanium	Sylvania	IN277
D8	QV2-0008	Diode, Zener 10V	Motorola	IN5240B
J1	JJ0-2201	Connector, 22-Pin Edge	Cinch-Jones	252-50-22B-10
J2	JT0-0002	Testpoint, Jack	Cambion	3388-1-03
J2	JT1-0002	Testpoint, Plug	Cambion	2971-2
J3	JT0-0002	Testpoint, Plug	Cambion	3388-1-03
M1	IM1-0001	Meter, Edgescale	Lafayette Radio	99T5033
P1	JJ1-0101	Connector, Quick Disconnect Tab	H.H. Smith	5009
P2	JJ1-0101	Connector, Quick Disconnect Tab	H.H. Smith	5009
P3	JJ1-0101	Connector, Quick Disconnect Tab	H.H. Smith	5009
P4	JJ1-0101	Connector, Quick Disconnect Tab	H.H. Smith	5009
Q1	VB0-1003	Transistor, Silicon NPN	RCA	2N697
Q2	VB0-1004	Transistor, Silicon NPN	RCA	40625
Q3	VB0-1005	Transistor, Silicon NPN	Motorola	2N1711
R1	RG3-2702	Res., Comp. 27K ½W 5%	AB	
R2	RG3-0022	Res., Comp. 2.2Ω ½W 5%	AB	
R3	RG3-1501	Res., Comp. 1.5K ½W 5%	AB	
R4	RG6-0680	Res., Comp. 68Ω 5W 5%	Ohmite	995-5B
R5	RC3-1504	Res., Film 1.5M ½W 1%	Electra	MF7C
R6	RG3-6802	Res., Comp. 68K ½W 5%	AB	
R7	RG3-6804	Res., Comp. 6.8M ½W 5%	AB	
R8	RG3-5602	Res., Comp. 56K ½W 5%	AB	
R9	RG3-4701	Res., Comp. 4.7K ½W 5%	AB	
R10	PA2-1031	Res., Horiz. P.C. Mtg. 10K ¼W	Mallory	MTC14L4
R11	RG3-1802	Res., Comp. 18K ½W 5%	AB	
R12	RG3-1003	Res., Comp. 100K ½W 5%	AB	
R13	PA2-1041	Res., Horiz. P.C. Mtg. 100K ¼W	Mallory	MTC15L4
R14	RG3-2493	Res., Film 249K 1/8W. 1%	Electra	MF7C
R15	RG3-0471	Res., Comp. 470Ω ½W. 5%	AB	
R16	RC3-4993	Res., Film 499K 1/8W. 1%	Electra	MF7C
S1	ON0-0004	Switch, Pushbutton	UID	7S05-322N-P5B1
T1	LA9-0001	Transformer, Interstage	Allied Radio	54D2387

Parts List, Control Board - BL1-0141B of Model 141-B

SECTION VII

7.1 Signal Conditioner, Model 141-1, Description - Ref. Fig. 4, 5, 6, 7.

7.2 The Signal Conditioner employs two operational amplifiers whose maximum gain is 20 dB each, and whose combined gain meets the 40 dB specified gain. Gain steps from 0 to 40 dB in 10 dB increments are switch-selected by gain-dB pushbuttons on the 141-1 panel.

7.3 Another feature used in conjunction with the Signal Conditioner is a means of remote gain control employing relays K1, K2 & K3. The remote gain control allows the operator to remotely reduce the gain of the input stage of the Signal Conditioner to a maximum of 0 dB in 10 dB increments. The relays, which are energized externally, operate from 24-30 Volts DC source and have a maximum combined power requirement of 30 mA @ 24 VDC.

7.3.1 The external wiring arrangement required for proper operation is shown in Fig. 1.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
*	REPLACES XC4 0141B IS .E1	1-19-71	J T M

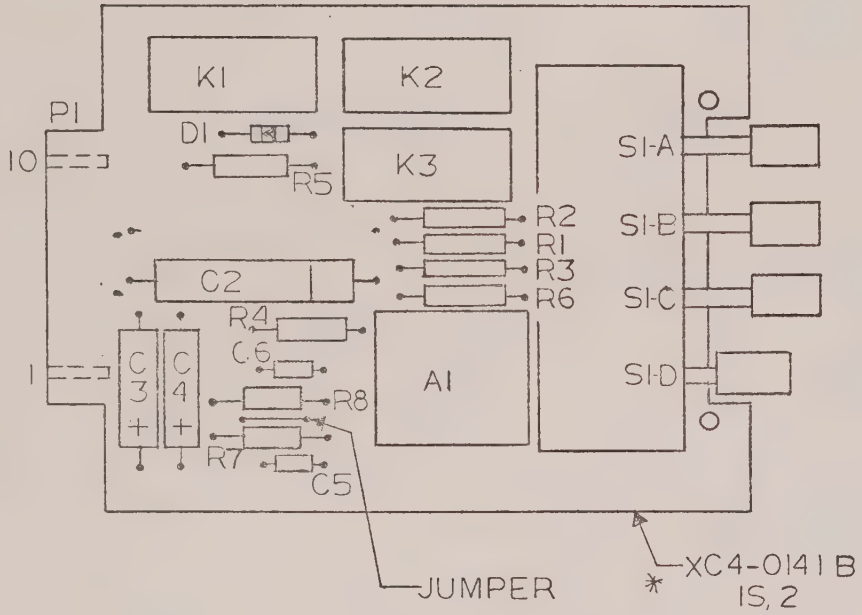


Fig.4

SCALE	NEXT ASS'Y C-1317	S.O. 141-B
TITLE: COMPONENT LAYOUT BL1-1411		B & K INSTRUMENTS, INC. CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 10-16-70	SIZE: A	DRAWING NUMBER: 1301
CHECKED Gumeny DATE 23 Oct 70		ISSUE: 2
APPROVED DATE		

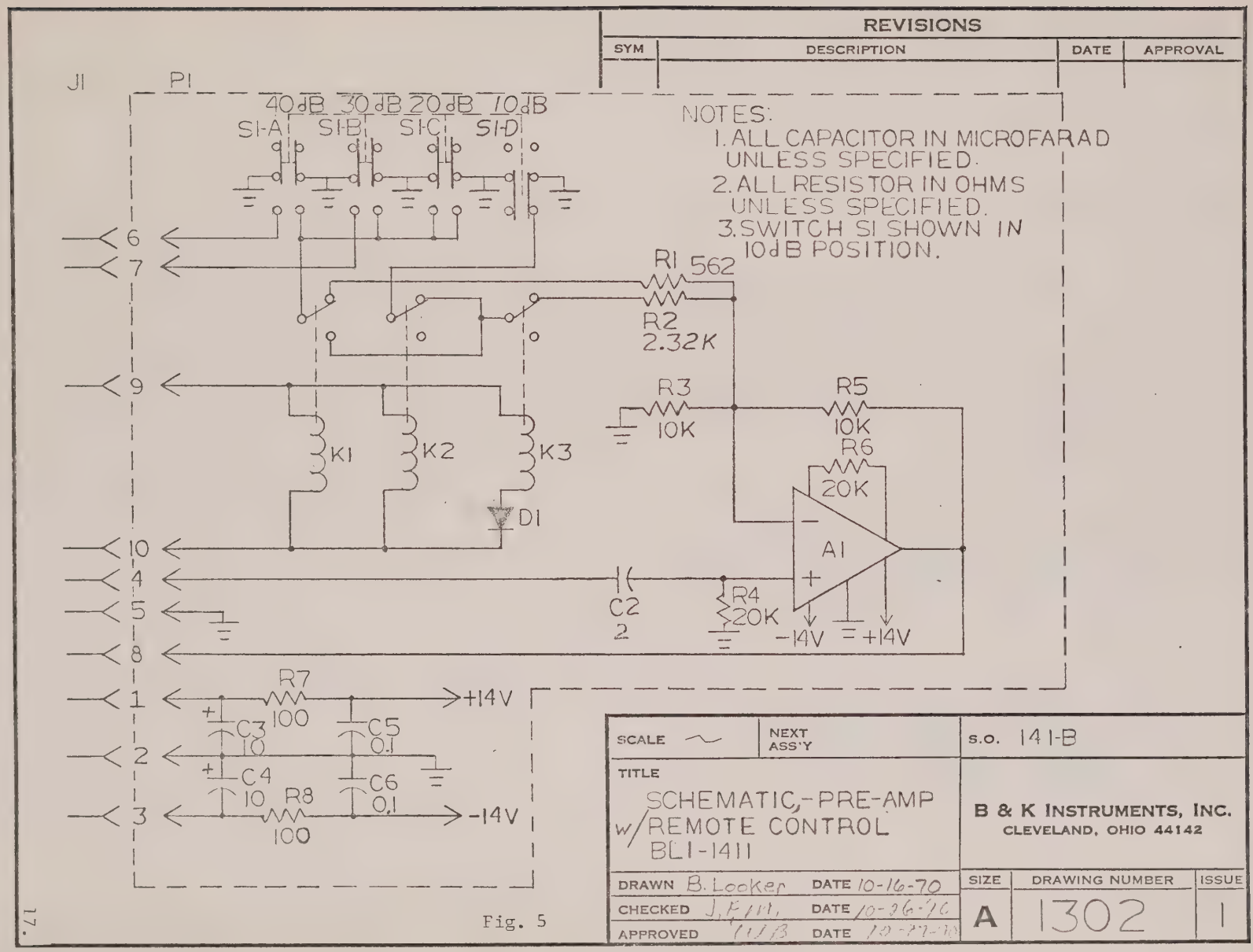

REVISIONS
SYM
DESCRIPTION
DATE
APPROVAL
J1
P1
40dB 30dB 20dB 10dB
S1-A
S1-B
S1-C
S1-D
NOTES:
1. ALL CAPACITOR IN MICROFARAD UNLESS SPECIFIED.
2. ALL RESISTOR IN OHMS UNLESS SPECIFIED.
3. SWITCH S1 SHOWN IN 10dB POSITION.
R1 562
R2 2.32K
R3 10K
R5 10K
R6 20K
K1
K2
K3
D1
A1
C2 2
R4 20K
-14V
+14V
R7 100
C3 10
C5 0.1
C4 10
C6 0.1
R8 100
+14V
-14V
6
7
9
10
4
5
8
1
2
3
SCALE
NEXT ASS'Y
S.O. 141-B
TITLE
SCHEMATIC,-PRE-AMP w/REMOTE CONTROL BL1-1411
B & K INSTRUMENTS, INC.
CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 10-16-70
CHECKED J.F.M. DATE 10-26-70
APPROVED [illegible] DATE 10-27-70
SIZE
DRAWING NUMBER
ISSUE
A
1302
1

Fig. 5

Ckt. Symbol	Part No.	Description	Typical Mfr.	Mfr's Part No.
A1	VS0-0002	Amplifier	AD	118A
C2	CP-0014	Cap., Paper 2.2 µf 100 V.	B & K	CP-0014
C3	CE3-1065	Cap. Elect. 10 uf @ 25 VDC	Sprague	TE-1204
C4	CE3-1065	Cap. Elect. 10 uf @ 25 VDC	Sprague	TE-1204
C5	CK6-1043	Cap. Ceramic 0.1 uf @ 100 VDC	Erie	8131-100-651-104M
C6	CK6-1043	Cap. Ceramic 0.1 uf @ 100 VDC	Erie	8131-100-651-104M
D1	QV0-0001	Diode, Silicon	Motorola	IN-4148
K1	OC1-0002	Relay	Phipps	PS-1017-3
K2	OC1-0002	Relay	Phipps	PS-1017-3
K3	OC1-0002	Relay	Phipps	PS-1017-3
R1	RC3-5620	Res., Film 562Ω ½w 1%	Electra	MF7C
R2	RC3-2321	Res., Film 2.32K ½w 1%	Electra	MF7C
R3	RC3-1002	Res., Film 10K ½w 1%	Electra	MF7C
R4	RC3-2002	Res., Film 20K ½w 1%	Electra	MF7C
R5	RC3-1002	Res., Film 10K ½w 1%	Electra	MF7C
R6	RC3-2002	Res., Film 20K ½w 1%	Electra	MF7C
R7	RG3-1000	Res., Comp. 100Ω ½w 5%	AB	
R8	RG3-1000	Res., Comp. 100Ω ½w 5%	AB	
S1	OM2-0201	Switch, Pushbutton	UID	5L04-322N-P5B1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
*	REPLACES XC7 0141B ISSUE 1	1-19-71	g 7 71

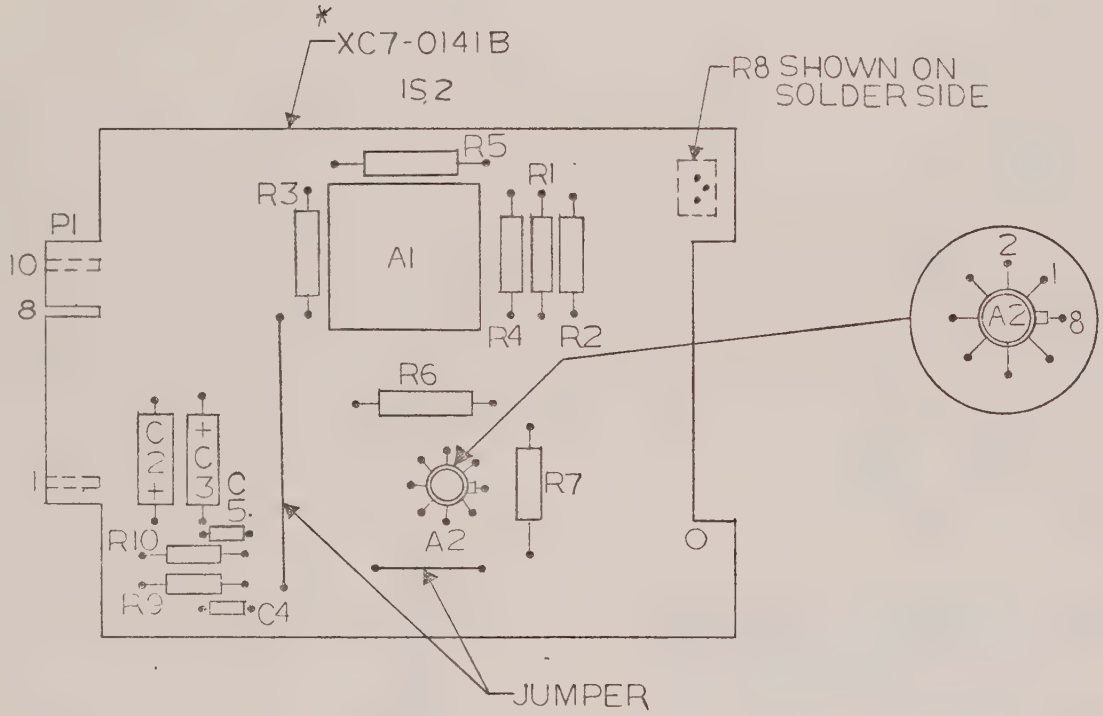


Fig. 6

SCALE	NEXT ASS'Y C-1317	S.O. 141-B	
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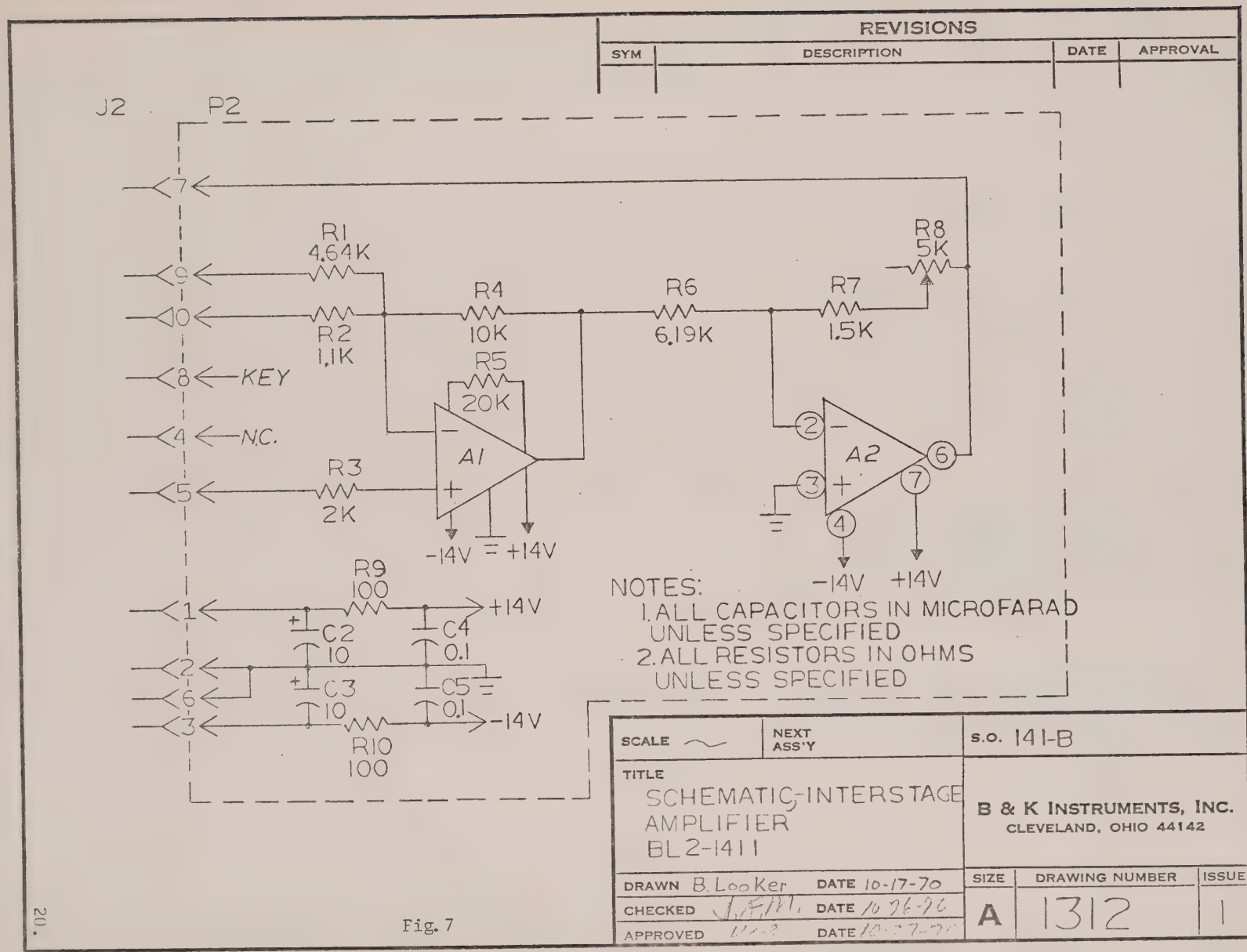
DRAWN B. Looker DATE 10-16-70		SIZE	DRAWING NUMBER	ISSUE
CHECKED Gumeny DATE 23 Oct. 70		A	1311	2
APPROVED DATE				


REVISIONS
SYM
DESCRIPTION
DATE
APPROVAL
J2
P2
7
9
10
8
4
5
1
2
6
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KEY
N.C.
R1
4.64K
R2
1.1K
R3
2K
R4
10K
R5
20K
R6
6.19K
R7
1.5K
R8
5K
A1
A2
-14V
+14V
R9
100
R10
100
C2
10
C3
10
C4
0.1
C5
0.1
+14V
-14V
NOTES:
1. ALL CAPACITORS IN MICROFARAD UNLESS SPECIFIED
2. ALL RESISTORS IN OHMS UNLESS SPECIFIED
SCALE
NEXT ASS'Y
S.O. 141-B
TITLE
SCHEMATIC, INTERSTAGE AMPLIFIER
BL 2-1411
B & K INSTRUMENTS, INC.
CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 10-17-70
CHECKED J.F.M. DATE 10-26-70
APPROVED DATE
SIZE
DRAWING NUMBER
ISSUE
A
1312
1

Fig. 7

Ckt. Symbol	Part No.	Description	Typical Mfr.	Mfr's Part No.
A1	VS0-0002	Amplifier	B&K	
A2	VJ0-0003	Linear IC	Fairchild	U5B7741393
C2	CE3-1065	Cap. Elect. 10 uf @ 25 VDC	Sprague	TE-1204
C3	CE3-1065	Cap. Elect. 10 uf @ 25 VDC	Sprague	TE-1204
C4	CK6-1043	Cap. Ceramic 0.1 uf @ 100 VDC	Erie	8131-100-651-104M
C5	CK6-1043	Cap. Ceramic 0.1 uf @ 100 VDC	Erie	8131-100-651-104M
R1	RC3-4641	Res., Film 4.64K ½w 1%	Electra	MF7C
R2	RC3-1001	Res., Film 1.1K ½w 1%	Electra	MF7C
R3	RC3-2001	Res., Film 2K ½w 1%	Electra	MF7C
R4	RC3-1002	Res., Film 10K ½w 1%	Electra	MF7C
R5	RC3-2002	Res., Film 20K ½w 1%	Electra	MF7C
R6	RC3-6191	Res., Film 6.19K ½w 1%	Electra	MF7C
R7	RC3-1501	Res., Film 1.5K ½w 1%	Electra	MF7C
R8	PA3-5021	Res., Var., P.C. 5K ½w	IRC	556
R9	RG3-1000	Res., Comp., 100Ω ½w 5%	AB	
R10	RG3-1000	Res., Comp., 100Ω ½w 5%	AB	

SECTION VIII

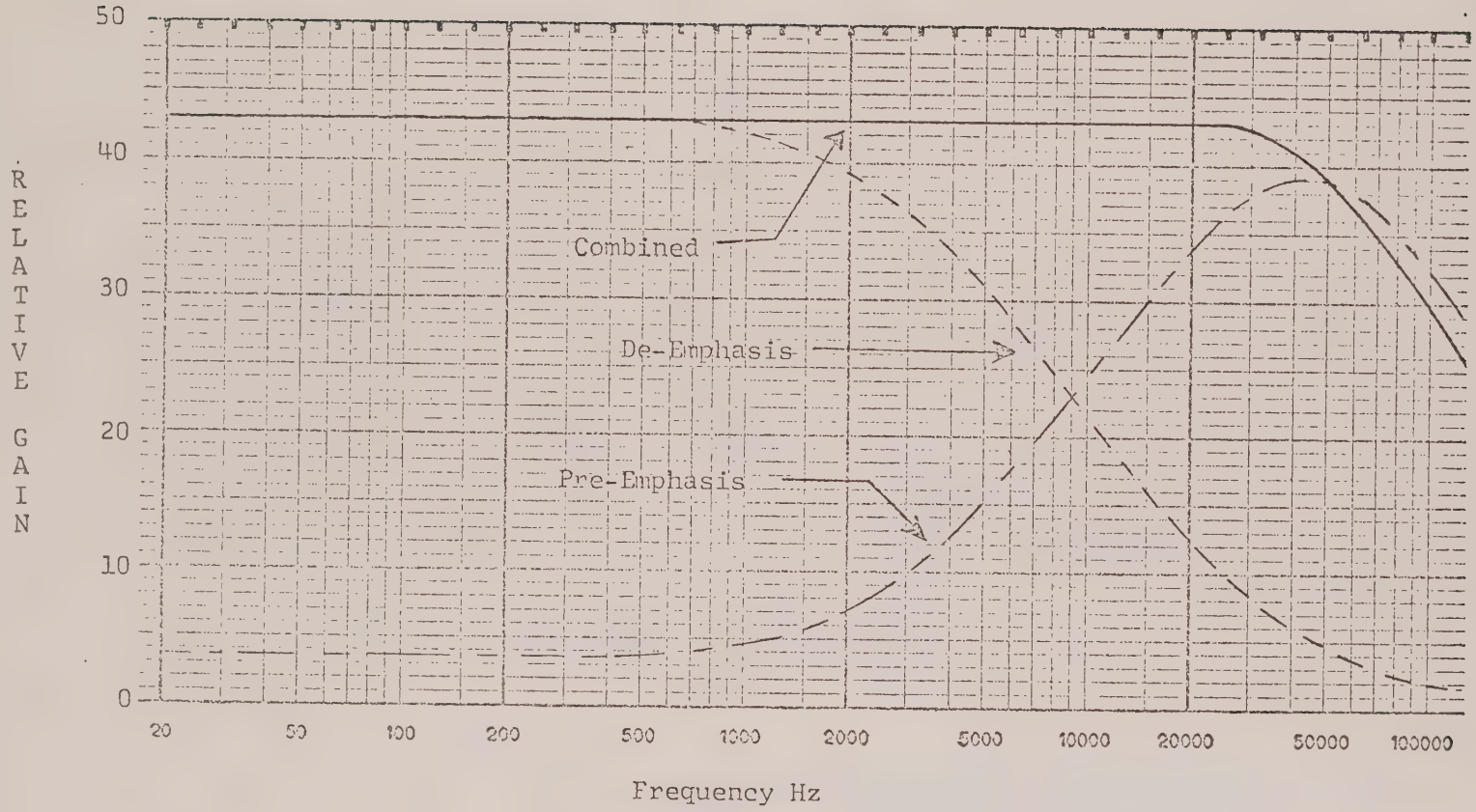
8.1 Filter, M-141-5, Description - Ref. Fig. 8, 9, 10 & Graph I.

8.2 Filter, M-141-5, contains the two circuits below.

8.2.1 BL1-1415 contains a pushbutton which places the selected filter in the circuit ahead of the signal conditioner.

8.2.2 BL2-1415, the Pre-Emphasis Filter, is basically an active high pass filter with a predictable 12 dB per octave characteristic and will amplify signals whose frequencies fall within the band width of 1 KHz - 12 KHz.

8.2.3 When used in conjunction with its complement, the B & K Model SQ-112DE De-Emphasis Filter, data may be preconditioned to effectively use limited dynamic range recording devices prior to performing an analysis. When used in this manner, the net translation error will be less than $\pm$ .25 dB for frequencies up to 12 KHz, discounting of course normal recorder losses. Graph I depicts the individual and combined characteristics of the BL2-1415 Pre-Emphasis Filter and the Model SQ-112DE.


RELATIVE GAIN
50
40
30
20
10
0
Combined
De-Emphasis
Pre-Emphasis
20
50
100
200
500
1000
2000
5000
10000
20000
50000
100000
Frequency Hz

Graph I

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

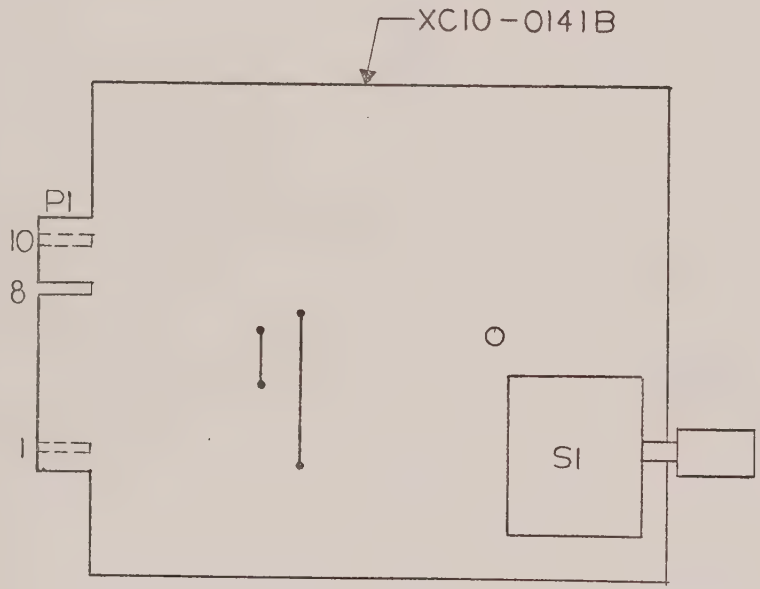
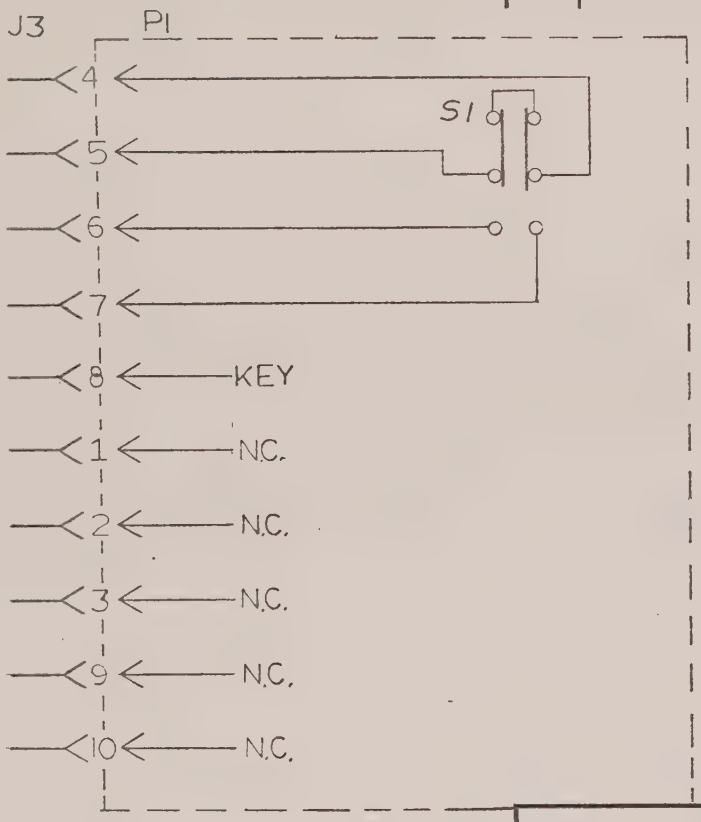


Fig. 8

SCALE	NEXT ASS'Y C-1318	S.O. 141-B
TITLE: COMPONENT LAYOUT BLI-1415		B & K INSTRUMENTS, INC. CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 10-17-70	SIZE: A	DRAWING NUMBER: 1309
CHECKED [illegible] DATE 23 Oct 70		ISSUE: 1
APPROVED [illegible] DATE 26 Oct 70		

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



NOTE:

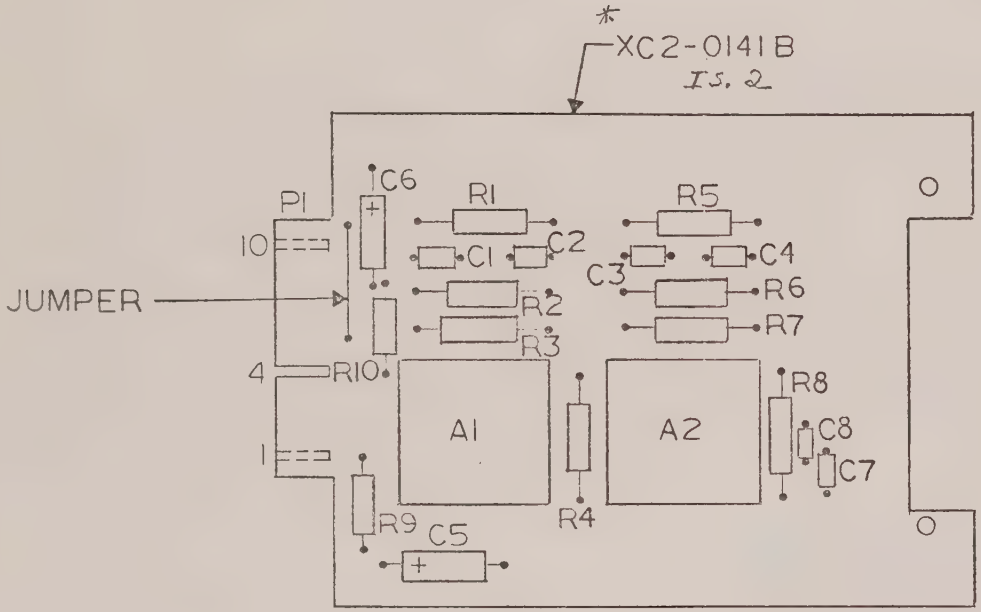
1. SWITCH S1 NOT SHOWN IN EXTERNAL FILTER POSITION.

SCALE	NEXT ASS'Y	S.O. 141-B
TITLE: SCHEMATIC, EXT. FILTER SWITCH BL1-1415		B & K INSTRUMENTS, INC. CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 10-17-70		SIZE: A
CHECKED J.F.M. DATE 10-26-70		DRAWING NUMBER: 1310
APPROVED [illegible] DATE [illegible]		ISSUE: 1

Fig. 9

Ckt. Symbol	Part No.	Description	Typical Mfr.	Mfr's Part No.
S1	OM2-0202	Switch, 1 Sta., DPDT	UID	5P01-322N-P5B1

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
*	REPLACES XC2 0141B, ISSUE 1	1-19-71	



SCALE	NEXT ASS'Y C-1318	S.O. 141-B	
TITLE: COMPONENT LAYOUT BL 2-141 5		B & K INSTRUMENTS, INC. CLEVELAND, OHIO 44142	
DRAWN B. Looker DATE 10-17-70		SIZE	DRAWING NUMBER	ISSUE
CHECKED [illegible] DATE 11-01-70		A	1307	2
APPROVED [illegible] DATE 26 Oct 70				

Fig. 10

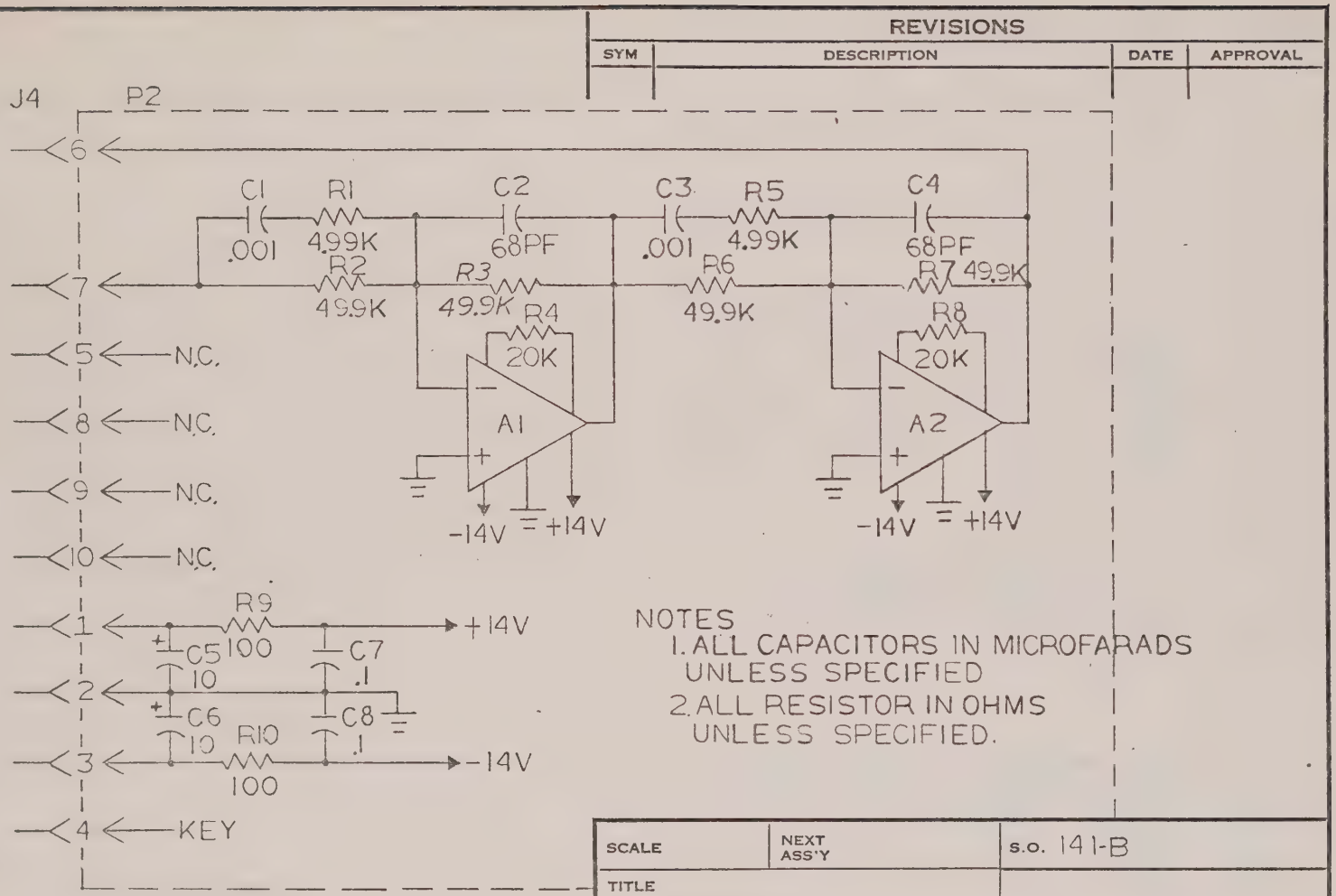

REVISIONS
SYM
DESCRIPTION
DATE
APPROVAL
J4
P2
6
7
5
8
9
10
1
2
3
4
N.C.
N.C.
N.C.
N.C.
KEY
C1
.001
R1
4.99K
R2
49.9K
C2
68PF
R3
49.9K
R4
20K
A1
-14V
+14V
C3
.001
R5
4.99K
R6
49.9K
C4
68PF
R7
49.9K
R8
20K
A2
-14V
+14V
R9
100
+14V
C5
10
C6
10
C7
.1
C8
.1
R10
100
-14V
NOTES
1. ALL CAPACITORS IN MICROFARADS UNLESS SPECIFIED
2. ALL RESISTOR IN OHMS UNLESS SPECIFIED.
SCALE
NEXT ASS'Y
S.O. 141-B
TITLE
SCHEMATIC, PRE-EMPHASIS BL2-1415
B & K INSTRUMENTS, INC.
CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 10-17-70
CHECKED J. F. M. DATE 10-26-70
APPROVED DATE 10-27-70
SIZE
DRAWING NUMBER
ISSUE
A
1308
1

Fig. 11

Ckt. Symbol	Part No.	Description	Typical Mfr.	Mfr's Part No.
A1	VSO-0002	Amplifier	AD	118A
A2	VSO-0002	Amplifier	AD	118A
C1	CK4-1020	Cap. Ceramic .001 uf @ 50 VDC	ACI	MR6NP0102F
C2	CM8-6801	Cap. Mica 68 pf @ 500 VDC	CDE	CD15ED680J
C3	CK4-1020	Cap. Ceramic .001 uf @ 50 VDC	ACI	MR6NP0102F
C4	CM8-6801	Cap. Mica 68 pf @ 500 VDC	CDE	CD15ED680J
C5	CE3-1065	Cap. Elect. 10 uf @ 25 VDC	Sprague	TE-1204
C6	CE3-1065	Cap. Elect. 10 uf @ 25 VDC	Sprague	TE-1204
C7	CK6-1043	Cap. Ceramic .1 uf @ 100 VDC	Erie	8131-100-651-104M
C8	CK6-1043	Cap. Ceramic .1 uf @ 100 VDC	Erie	8131-100-651-104M
R1	RC3-4991	Res., Film 4.99K ½w 1%	Electra	MF7C
R2	RC3-4992	Res., Film 49.9K ½w 1%	Electra	MF7C
R3	RC3-4992	Res., Film 49.9K ½w 1%	Electra	MF7C
R4	RC3-2002	Res., Film 20K ½w 1%	Electra	MF7C
R5	RC3-4991	Res., Film 4.99K ½w 1%	Electra	MF7C
R6	RC3-4992	Res., Film 49.9K ½w 1%	Electra	MF7C
R7	RC3-4992	Res., Film 49.9K ½w 1%	Electra	MF7C
R8	RC3-2002	Res., Film 20K ½w 1%	Electra	MF7C
R9	RG3-1000	Res., Comp., 100Ω ½w 5%	AB	
R10	RG3-1000	Res., Comp., 100Ω ½w 5%	AB	

SECTION IX

9.1 Transformer, M-141-3, Description - Fig. 12, 13.

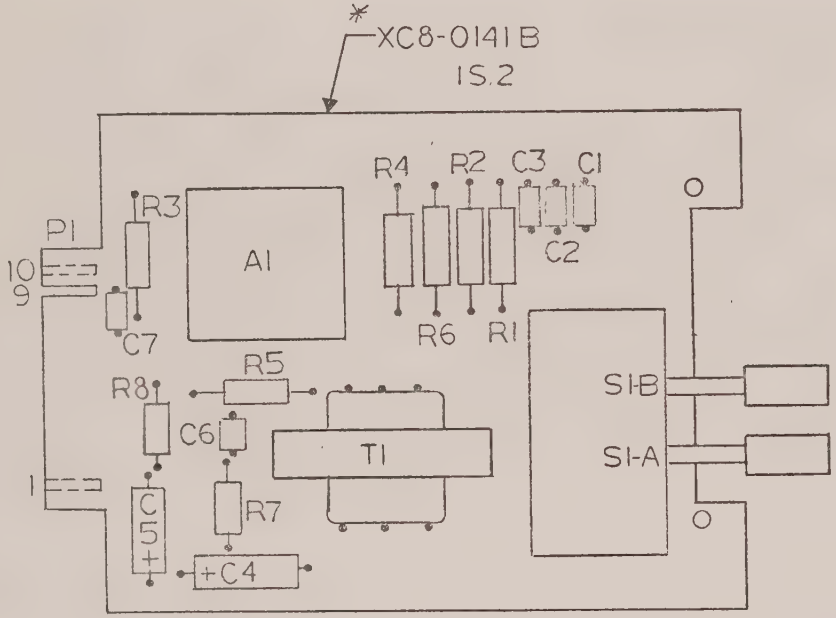
9.2 BL1-1413 contains a drive amplifier capable of 20 mA output with its feedback switch-selected for different lengths of output cable with its inherent shunt capacitance. The driver is matched to a 200 ohm output transformer with a center tap on the secondary tied to the shield of the output cable for use as a differential output.

9.2.1 Output connections of transformer at the output connector.

(a) Pins A and F used as differential output with Pin B, center tap of the transformer, to ground.

(b) Pins A and F used as a single-ended output with Pin F, the low side. Pin B, or shield, is not used.

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
*	REPLACES XC8 0141B ISSUE 1	1-19-71	J Frith



SCALE	NEXT ASS'Y C-1319	S.O. 141-B
TITLE: COMPONENT LAYOUT BLI-1413		B & K INSTRUMENTS, INC. CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 10-17-70	SIZE	DRAWING NUMBER
CHECKED Gurney DATE 23 Oct 70	A	1303
APPROVED [illegible] DATE 27 Oct 70		ISSUE 2

Fig. 12

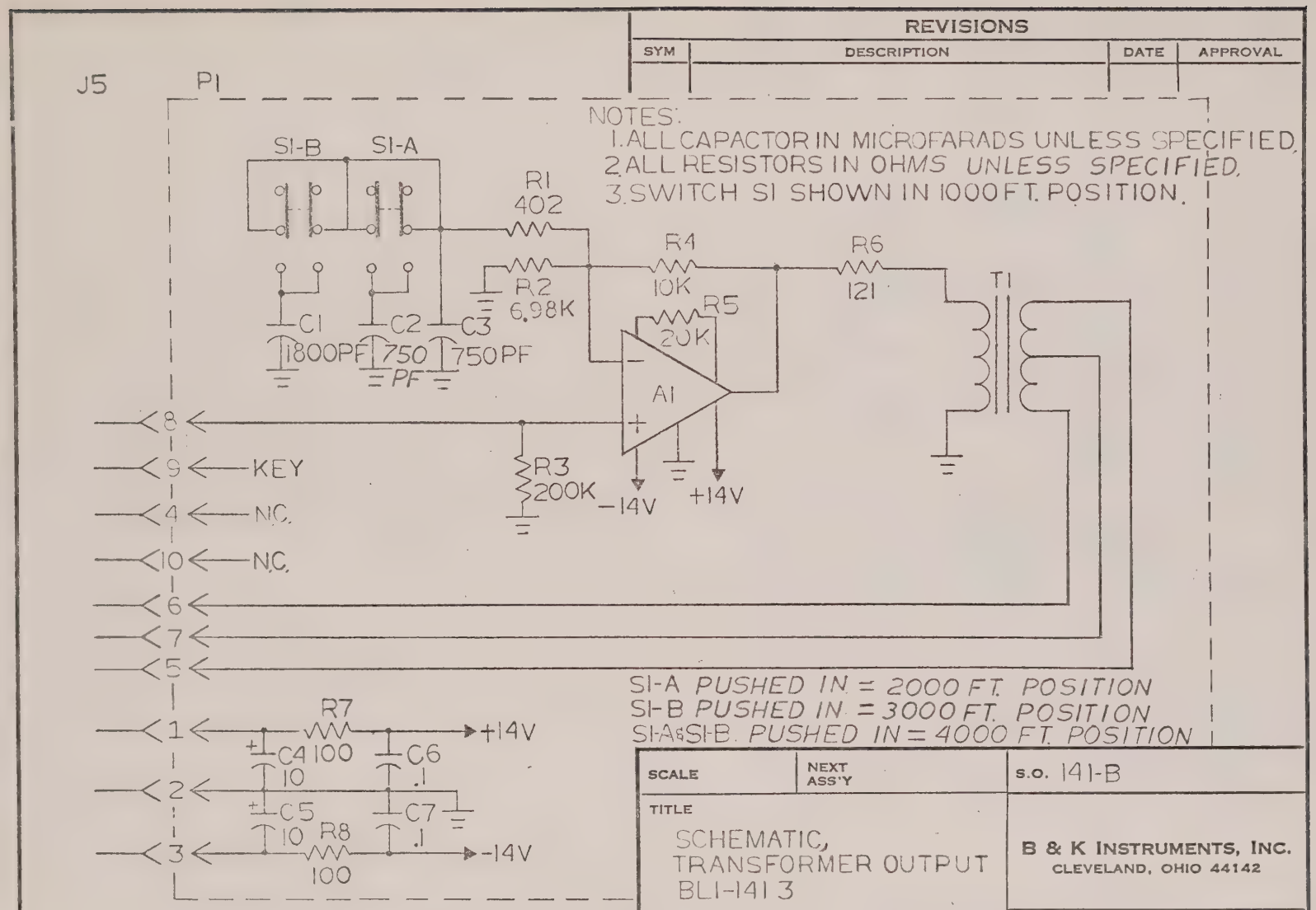

REVISIONS
SYM
DESCRIPTION
DATE
APPROVAL
J5
P1
NOTES:
1. ALL CAPACTOR IN MICROFARADS UNLESS SPECIFIED.
2. ALL RESISTORS IN OHMS UNLESS SPECIFIED.
3. SWITCH S1 SHOWN IN 1000 FT. POSITION.
S1-B
S1-A
R1
402
R2
6.98K
R4
10K
R5
20K
R6
121
T1
C1
1800PF
C2
750 PF
C3
750PF
A1
8
9
KEY
4
N.C.
10
N.C.
6
7
5
R3
200K
-14V
+14V
S1-A PUSHED IN = 2000 FT. POSITION
S1-B PUSHED IN = 3000 FT. POSITION
S1-A & S1-B PUSHED IN = 4000 FT. POSITION
R7
1
+14V
C4
100
10
C6
.1
2
C5
10
C7
.1
R8
3
-14V
100
SCALE
NEXT ASS'Y
S.O. 141-B
TITLE
SCHEMATIC,
TRANSFORMER OUTPUT
BLI-1413
B & K INSTRUMENTS, INC.
CLEVELAND, OHIO 44142
DRAWN B. Looker
DATE 10-19-70
CHECKED J. F., III.
DATE 10-26-70
APPROVED
DATE
SIZE
DRAWING NUMBER
ISSUE
A
1304
1

Fig. 13

Ckt. Symbol	Part No.	Description	Typical Mfr.	Mfr's Part No.
A1	VS0-0003	Amplifier	AD	119A
C1	CM8-1821	Cap., Mica 1800 pf @ 500 VDC	CDE	CD19FD182J
C2	CM8-7512	Cap., Mica 750 pf @ 500 VDC	CDE	CD15FC751J
C3	CM8-7512	Cap., Mica 750 pf @ 500 VDC	CDE	CD15FC751J
C4	CE3-1065	Cap. Elect. 10 uf @ 25 VDC	Sprague	TE-1204
C5	CE3-1065	Cap., Elect. 10 uf @ 25 VDC	Sprague	TE-1204
C6	CK6-1043	Cap. Ceramic .1 uf @ 100 VDC	Erie	8131-100-651-104M
C7	CK6-1043	Cap. Ceramic .1 uf @ 100 VDC	Erie	8131-100-651-104M
R1	RC3-4020	Res., Film 402Ω ½w 1%	Electra	MF7C
R2	RC3-6981	Res., Film 6.98K ½w 1%	Electra	MF7C
R3	RC3-2003	Res., Film 200K ½w 1%	Electra	MF7C
R4	RC3-1002	Res., Film 10K ½w 1%	Electra	MF7C
R5	RC3-2002	Res., Film 20K ½w 1%	Electra	MF7C
R6	RC3-1210	Res., Film 121Ω ½w 1%	Electra	MF7C
R7	RG3-1000	Res., Comp., 100Ω ½w 5%	AB	
R8	RG3-1000	Res., Comp., 100Ω ½w 5%	AB	
S1	OM2-0203	Switch, 2 Sta. DPDT Push-Push	UID	5P02-322N-P5B1
T1	LA1-0001	Transformer, Isolation	Central Trans	B65-103

SECTION X

10.1 Battery Charger, M-141-4 - Ref. Fig. 14 & 15.

10.2 The M-141-4 is a battery charger designed to charge the 141B battery at a 200 mA rate and by means of voltage sensing, terminate the 200 mA charge and then maintain a 50 mA trickle charge until power is removed. In operation, application of power to P1 will energize L1 and if battery voltage is low, L2 will not light indicating the 200 mA high rate charge. As the charging cycle progresses and approaches full charge, L2 will flicker and finally fully light at which time a trickle charge of 50 mA will be maintained.

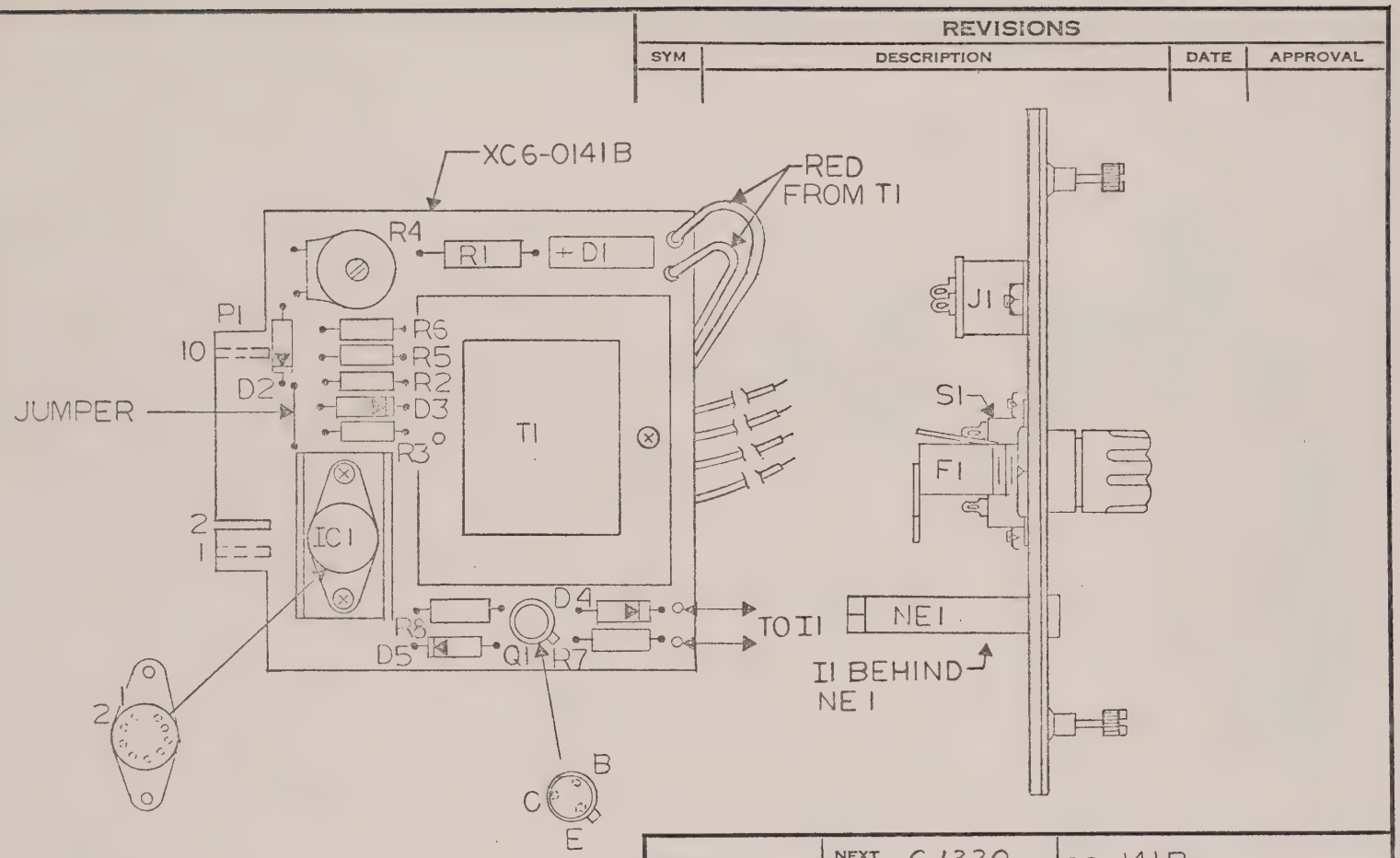
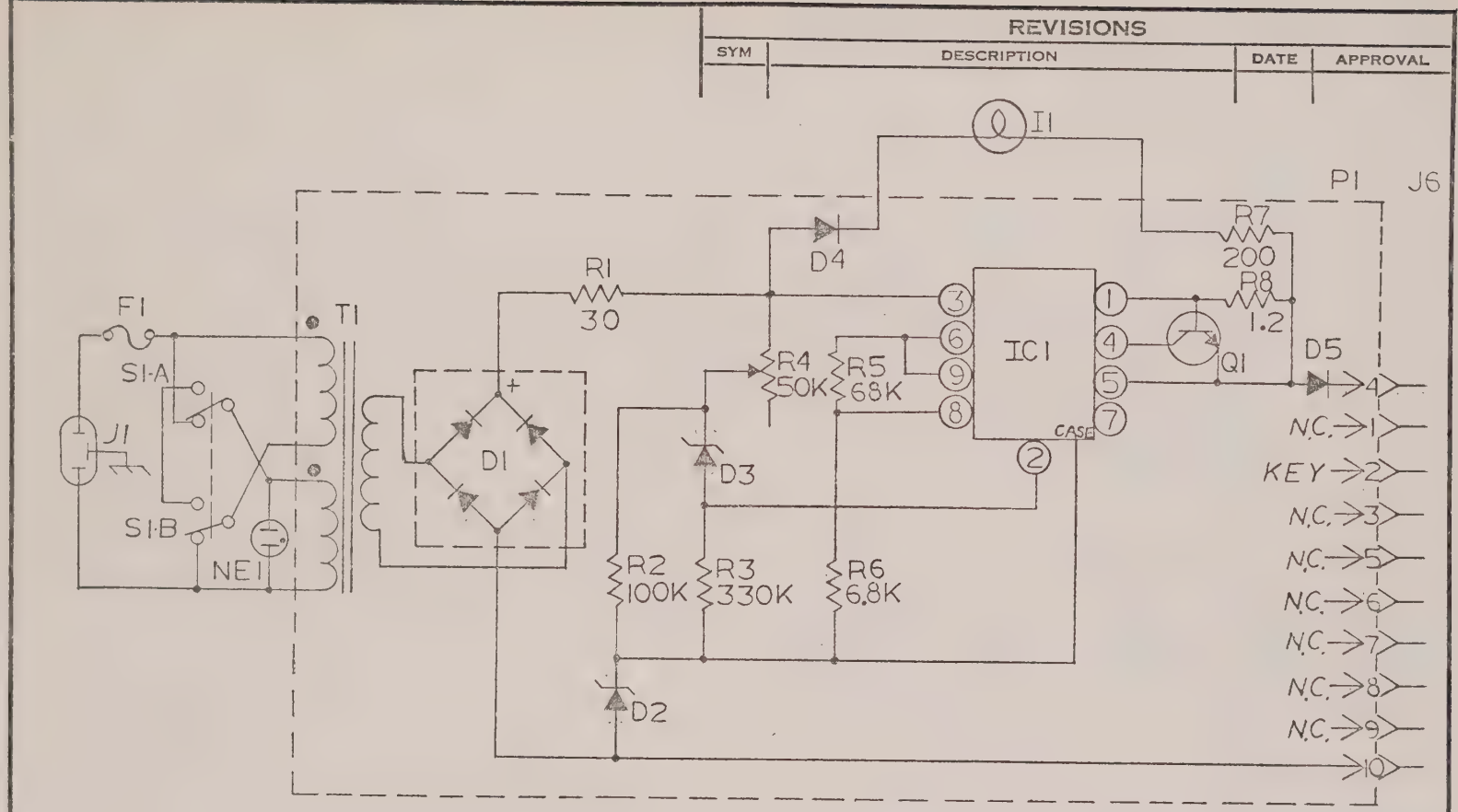

REVISIONS
SYM
DESCRIPTION
DATE
APPROVAL
XC6-0141B
RED
FROM T1
R4
R1
+D1
P1
10
D2
JUMPER
R6
R5
R2
D3
R3
T1
2
1
IC1
D4
R8
D5
Q1
R7
TO I1
NE1
I1 BEHIND
NE1
J1
S1
F1
2
1
C
B
E
SCALE
NEXT ASS'Y C-1320
S.O. 141-B
TITLE
COMPONENT LAYOUT
BL1-1414
B & K INSTRUMENTS, INC.
CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 10-19-70
CHECKED Gurney DATE 23 Oct. 70
APPROVED DATE
SIZE
A
DRAWING NUMBER
1305
ISSUE
1

Fig. 14



NOTES:

1. ALL RESISTORS IN OHMS UNLESS SPECIFIED
2. SWITCH S1 SHOWN IN 115VAC POSITION

SCALE ~	NEXT ASS'Y	S.O. 141-B
TITLE: SCHEMATIC, BATTERY CHARGER BLI-1414		B & K INSTRUMENTS, INC. CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 10-20-70	SIZE	DRAWING NUMBER
CHECKED J.F.M. DATE 10-26-70	A	1306
APPROVED [illegible] DATE [illegible]		ISSUE 2

Fig. 15

Ckt. Symbol	Part No.	Description	Typical Mfr.	Mfr's Part No.
D1	QV3-0001	Diode, Bridge	Bourns & Towne	BFW-100
D2	QV2-0011	Diode, Zener, 16V	Hughes	IN966
D3	QV2-0011	Diode, Zener, 16V	Hughes	IN966
D4	QV0-0005	Diode, Silicon	Motorola	IN4003
D5	QV0-0005	Diode, Silicon	Motorola	IN4003
IC1	VZ0-0001	Voltage Regulator	Motorola	MC1469R
Q1	VB0-1003	Transistor, NPN Silicon	RCA	2N697
R1	RX 0309	Res., Comp. 30Ω 5.5w; 10%	Bruel & Kjaer	
R2	RG3-1003	Res., Comp. 100K ½w 5%	AB	
R3	RG3-3303	Res., Comp. 330K ½w 5%	AB	
R4	PA2-5031	Res., Var. P.C. 50K ¼w	Mallory	MTC-54L4
R5	RG3-6802	Res., Comp. 68K ½w 5%	AB	
R6	RG3-6801	Res., Comp. 6.8K ½w 5%	AB	
R7	RG3-2000	Res., Comp. 200Ω ½w 5%	AB	
R8	RG3-0012	Res., Comp. 1.2Ω ½w 5%	AB	
T1	LA3-0004	Transformer, Power	Central Trans.	B65-104
F1	VF3-0001	Fuse, ½ Amp. Slo-Blo	Littlefuse	313.500
I1	JO0-0002	Lamp, Incandescent 14 V	Leecraft	41NG3-2313
J1	JA0-0001	Connector, Power	Switchcraft	AC3
NE1	JO0-0001	Lamp, Neon Tineon	Leecraft	36-N-2311
S1	ON0-0001	Switch, DPDT	Switchcraft	46256LFR
		MISCELLANEOUS		
	JS0-0003	Fuse Holder, Quick Connect	Littlefuse	342028A

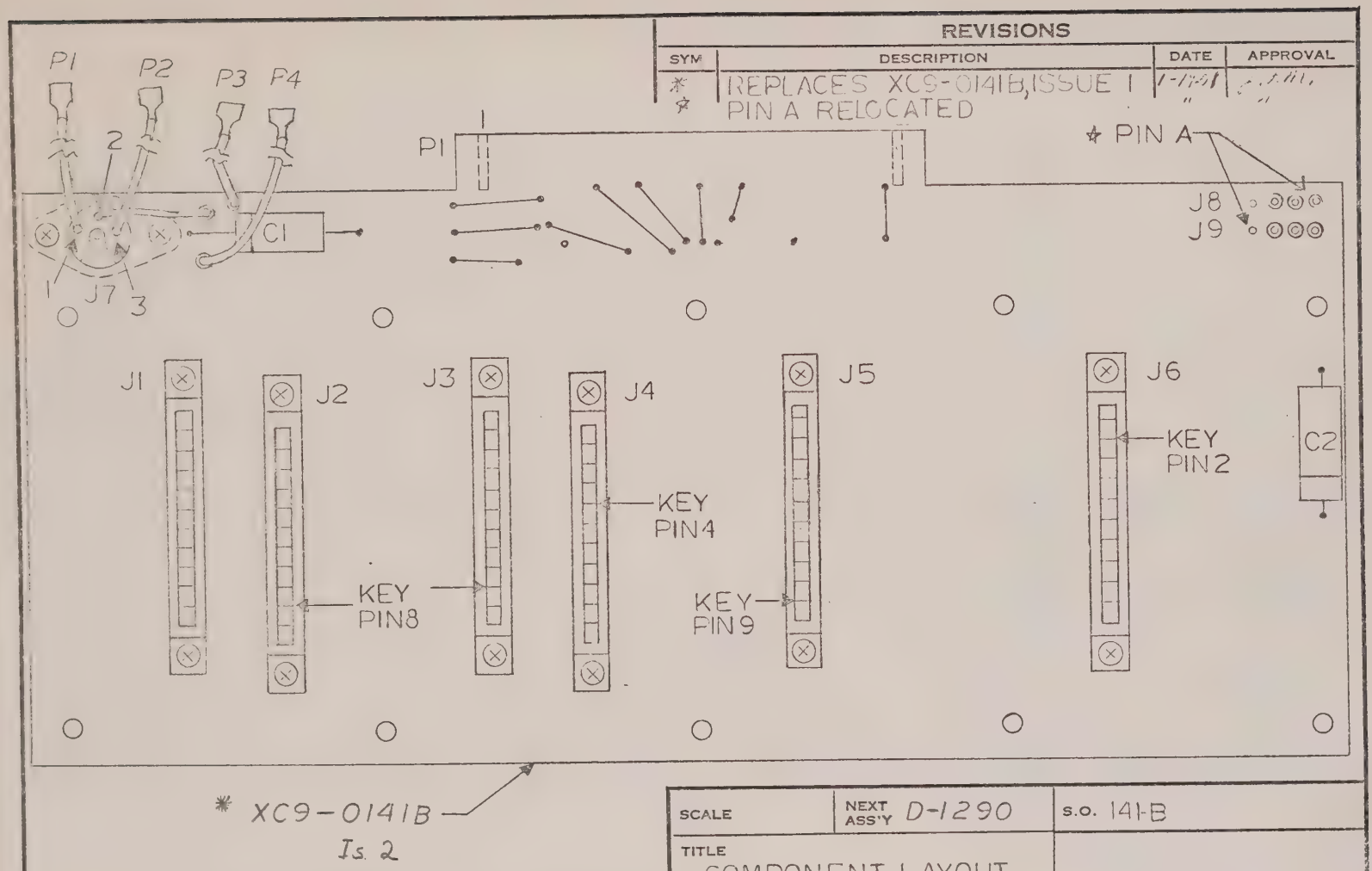
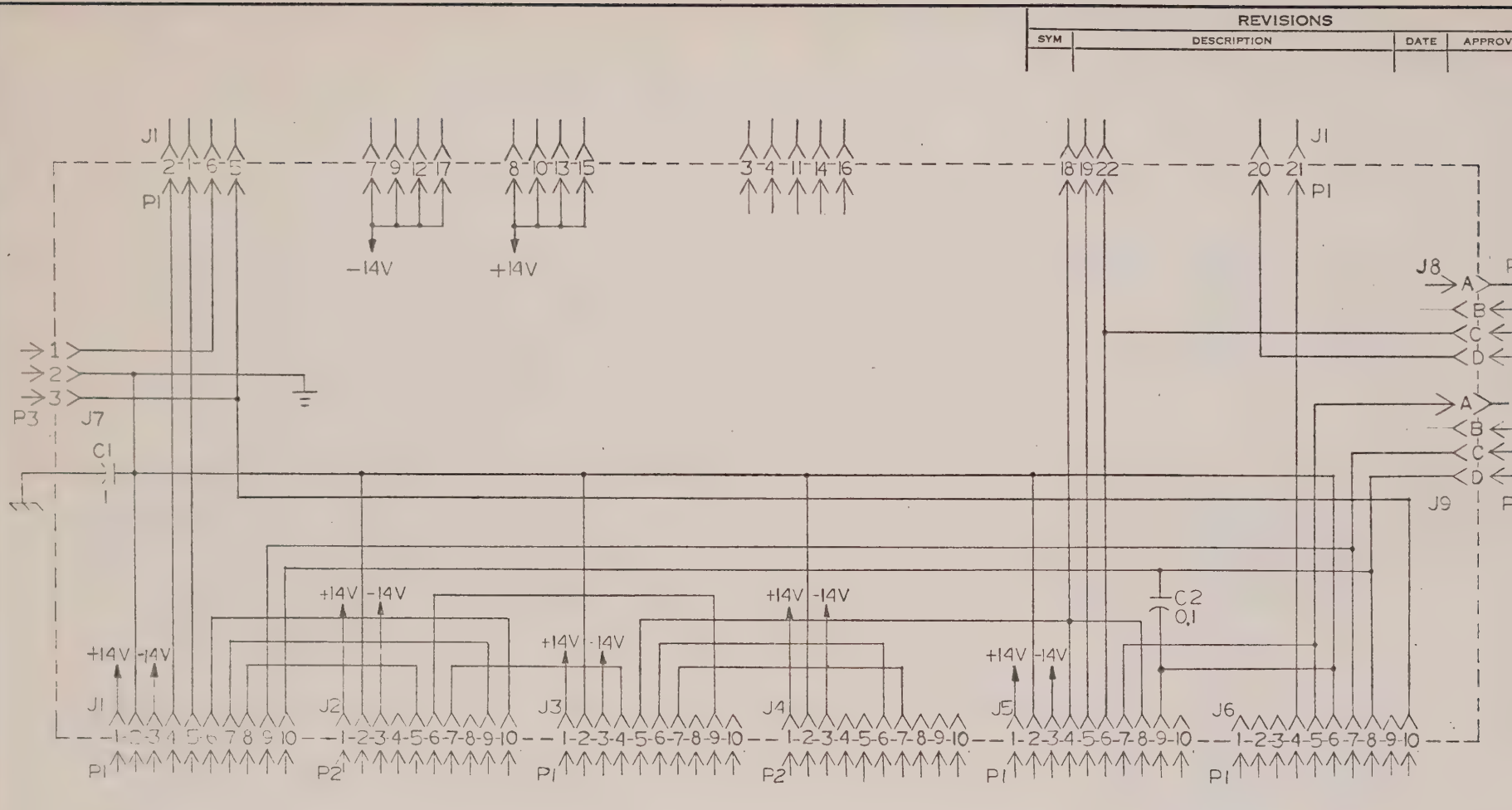

REVISIONS
SYM
DESCRIPTION
DATE
APPROVAL
* REPLACES XC9-0141B, ISSUE 1
☆ PIN A RELOCATED
1-17-71
P1
P2
P3
P4
2
C1
J7
3
P1
☆ PIN A
J8
J9
J1
J2
J3
J4
J5
J6
KEY PIN8
KEY PIN4
KEY PIN9
KEY PIN2
C2
* XC9-0141B Is. 2
SCALE
NEXT ASS'Y D-1290
S.O. 141-B
TITLE
COMPONENT LAYOUT
BL2-0141B
B & K INSTRUMENTS, INC.
CLEVELAND, OHIO 44142
DRAWN B. Looker
DATE 10-22-70
CHECKED
DATE
APPROVED
DATE
SIZE
DRAWING NUMBER
ISSUE
A
1313
2

Fig. 16



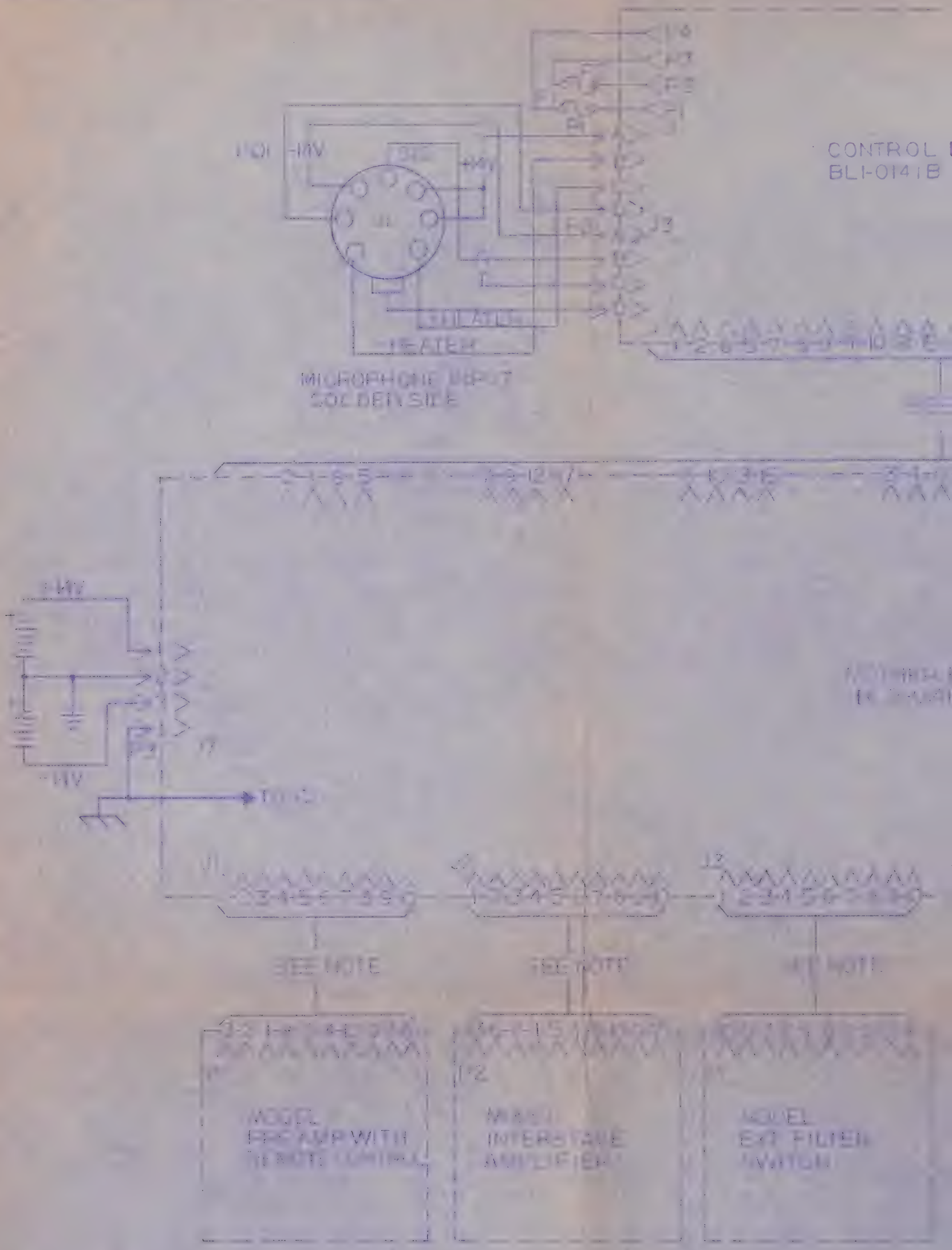
NOTE:
1. ALL CAPACITOR VALUES IN MICROFARADS UNLESS SPECIFIED.

SCALE	NEXT ASS'Y	S.O. 141-B
TITLE: MOTHER BOARD BL2-0141B		B & K INSTRUMENTS, IN CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 10-21-70	SIZE	DRAWING NUMBER
CHECKED J. F. M. DATE 10-26-70	B	1314
APPROVED DATE 10-27-70		

Ckt. Symbol	Part No.	Description	Typical Mfr.	Mfr's Part No.
C1	CL6-4732	Cap. Mylar .047 uf @ 100 VDC	CDE	CDWMF1S47
C2	CL7-1042	Cap. Mylar .1 uf @ 200 VDC	CDE	CDWMF2P1
J1	JJ0-1001	Connector, Edge 10-Pin	Cinch-Jones	252-50-10B-10
J2	JJ0-1001	Connector, Edge 10-Pin	Cinch-Jones	252-50-10B-10
J3	JJ0-1001	Connector, Edge 10-Pin	Cinch-Jones	252-50-10B-10
J4	JJ0-1001	Connector, Edge 10-Pin	Cinch-Jones	252-50-10B-10
J5	JJ0-1001	Connector, Edge 10-Pin	Cinch-Jones	252-50-10B-10
J6	JJ0-1001	Connector, Edge 10-Pin	Cinch-Jones	252-50-10B-10
J7	JJ0-0301	Connector, Jack 3-Pin	Switchcraft	57KD3M
J8	JT0-0002	Testpoint, Jack	Cambion	3388-1-03
J8	JT1-0002	Testpoint, Plug	Cambion	2971-2
J9	JT0-0002	Testpoint, Jack	Cambion	3388-1-03
J9	JT1-0002	Testpoint, Plug	Cambion	2971-2

Parts List, Mother Board - BL2-0141B of Model 141B

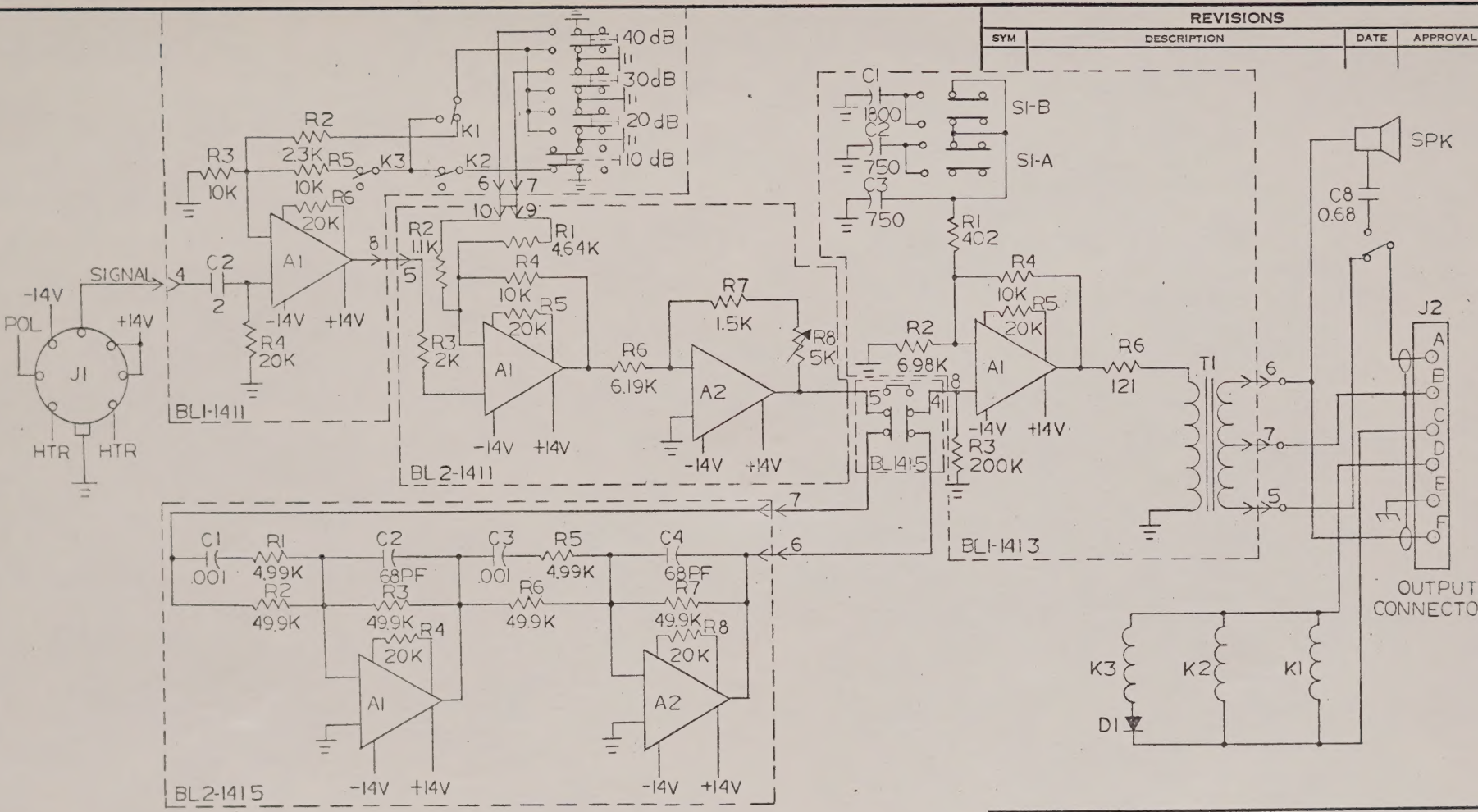
Ckt. Symbol	Part No.	Description	Typical Mfr.	Mfr's Part No.
F1	VF4-1001	Fuse, 1 Amp., Slo-Blo	Littlefuse	313001
F2	VF4-1001	Fuse, 1 Amp., Slo-Blo	Littlefuse	313001
J1	JJ0-0701	Connector, Microphone	Bruel & Kjaer	JJ-0703
J2	JJ0-0602	Connector, 6-Pin Jack	Burndy	BT07E106S
P1	JJ1-0401	Connector, 4-Pin minus "A" Pin	Winchester	JF4P-BCD
P2	JJ1-0402	Connector, 4-Pin	Winchester	JF4P
P3	JJ1-0301	Connector, 3-Pin Plug	Switchcraft	07QK3F
P4	JJ1-0401	Connector, 4-Pin Plug	Winchester	JF4P-BCD
P5	JJ1-0401	Connector, 4-Pin Plug	Winchester	JF4P-BCD
P6	JJ1-0601	Connector, 6-Pin Plug	Cannon	KPT0-6F10-6P
		MODULES		
	141-1	Signal Conditioner	B & K	
	141-3	Transformer Output	B & K	
	141-4	Battery Charger	B & K	
	141-5	Ext. Filter Switch	B & K	
		ACCESSORIES		
	DH1-0002	Holder, Tripod	B & K	
	DH1-1300	Holder Extension, Mike	B & K	
	VF2-1001	Fuse, 1/4 Amp. Slo-Blo	Littlefuse	313.250
	VF3-1001	Fuse, 1/2 Amp. Slo-Blo	Littlefuse	313.500
	VF4-1001	Fuse, 1 Amp. Slo-Blo	Littlefuse	313001
		Tripod	Bruel & Kjaer	UA-0026
		Adaptor, 1" Microphone	Bruel & Kjaer	DB-0375
		Adaptor, Tripod	Bruel & Kjaer	UA-0028
		Wind Screen	Bruel & Kjaer	VA-0237
		½" FET Preamp. w/modified Htr.	Bruel & Kjaer	2619/S28
		Holder, Microphone	Electro Voice	Model 30
		Adaptor, for above Holder	Atlas	AD2
		MISCELLANEOUS		
	A01-0001	Power Cord	Belden	17258
	DH0-0001	Handle Assy.	Amer. Handle	184-5041
	HP0-0002	Speaker 2"	Quam	22A06Z100
	JS0-0003	Fuse Holder	Littlefuse	342028A
	QB1-0001	Battery ± 14 V. Ni-Cad	Gould	MP-608


CONTROL
BLI-0141B
J3
MICROPHONE INPUT
SOLDER SIDE
+HV
-HV
J1
SEE NOTE
SEE NOTE
SEE NOTE
MODEL
PREAMP WITH
MODEL
INTERFACE
AMPLIFIER
MODEL
EXT FILTER
J2

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

SPEAKER

SCALE	SIZE / ASSY.	B & K INSTRUMENTS, INC.
TITLE	MODEL 1615	
DRAWN	DATE	SIZE C
CHECKED	DATE	
APPROVED	DATE	


REVISIONS
SYM
DESCRIPTION
DATE
APPROVAL
40 dB
30dB
20 dB
10 dB
K1
K2
K3
R2
2.3K
R3
10K
R5
10K
R6
20K
A1
-14V
+14V
SIGNAL
POL
J1
HTR
HTR
C2
R4
20K
BL1-1411
R2
1.1K
R1
4.64K
R4
10K
R5
20K
R3
2K
R6
6.19K
R7
1.5K
R8
5K
A2
BL2-1411
C1
1800
C2
750
C3
750
SI-B
SI-A
R1
402
R2
6.98K
R3
200K
BL1-1415
R6
121
T1
BL1-1413
SPK
C8
0.68
J2
A
B
C
D
E
F
OUTPUT
CONNECTO
K3
K2
K1
D1
C1
.001
R1
4.99K
C2
68PF
C3
.001
R5
4.99K
C4
68PF
R2
49.9K
R3
49.9K
R6
49.9K
R7
49.9K
R4
20K
R8
20K
BL2-1415
SCALE
NEXT ASS'Y
S.O. 18-086
TITLE
GENERAL SCHEMATIC
FOR MODEL 141B
(SIGNAL CIRCUIT)
B & K INSTRUMENTS, INC
CLEVELAND, OHIO 44142
DRAWN B. Looker DATE 12-21-70
CHECKED DATE 12-22-70
APPROVED DATE 12-23-70
SIZE
B
DRAWING NUMBER
1335